CLAIMS

What is claimed is:

1. An apparatus detecting binary data from an input signal read from an optical recording medium, the apparatus comprising:

a first signal processor nonlinearly converting the input signal based on a result of comparing an absolute value of the input signal and a predetermined critical value; and

a second signal processor detecting binary data from the nonlinearly converted signal.

2. The apparatus of claim 1, wherein the first signal processor saturates the input signal by the predetermined critical value when the absolute value of the input signal is bigger than the predetermined critical value and outputs the input signal when the absolute value of the input signal is smaller than the predetermined critical value.

3. The apparatus of claim 1, wherein the first signal processor outputs a difference of the absolute value of the input signal and the critical value when the absolute value of the input signal is bigger than the critical value and outputs zero when the absolute value of the input signal is smaller than the critical value.

4. The apparatus of claim 2, wherein the first signal processor includes a digital filter that yields the result of the following equation:

$$y = x \times \{|x| \leq k\} + k\,(-1)^{\{|x| \leq 0\}} \times \{|x| > k\}$$

wherein | | indicates an absolute value, the braces and their contents become one if a conditional expression contained therein is true and zero if a conditional expression contained therein is false, x is the input signal, and k is a predetermined value ranging from zero to a positive real number.

5. The apparatus of claim 3, wherein the first signal processor includes a digital filter that yields the result of the following equation:

$$y = x \times \{|x| > k\} + k\,(-1)^{\{|x| > 0\}} \times \{|x| > k\}$$

wherein | | indicates an absolute value, the braces and their contents become one if a conditional expression contained therein is true and zero if a conditional expression contained therein is false, *x* is the input signal, k and is a predetermined value ranging from zero to a positive real number.

6. The apparatus of claim 4, wherein the first signal processor is a digital filter.

7. The apparatus of claim 5, wherein the first signal processor is a digital filter.

8. The apparatus of claim 4, wherein the first signal processor comprises a finite impulse response (FIR) filter in front of the digital filter.

9. The apparatus of claim 5, wherein the first signal processor comprises an FIR filter in front of the digital filter.

10. The apparatus of claim 4, wherein the first signal processor comprises an FIR filter behind the digital filter.

11. The apparatus of claim 5, wherein the first signal processor comprises an FIR filter behind the digital filter.

12. The apparatus of claim 4, wherein the first signal processor comprises FIR filters, respectively, in front of and behind the digital filter.

13. The apparatus of claim 5, wherein the first signal processor comprises FIR filters, respectively, in front of and behind the digital filter.

14. The apparatus of claim 4, wherein the first signal processor comprises an FIR filter that is connected to the digital filter in parallel.

15. The apparatus of claim 5, wherein the first signal processor comprises an FIR filter that is connected to the digital filter in parallel.

16. The apparatus of claim 1, wherein the second signal processor is a viterbi decoder and the viterbi decoder uses one of three methods, that is a PR (a,b,a) method, a PR (a,b,b,a,) method, and a PR (a,b,c,b,a) method.

17. The apparatus of claim 16, wherein the viterbi decoder uses an equalizer that adjusts the frequency characteristics of the input signal.

18. A method of detecting binary data from an input signal read from an optical recording medium, the method comprising:

converting the input signal nonlinearly based on a result of comparing an absolute value of the input signal and a predetermined critical value; and

detecting binary data from the nonlinearly converted signal.

19. The method of detecting binary data of claim 18, wherein the converting the input signal nonlinearly further comprises:

saturating the input signal when the absolute value of the input signal is bigger than the predetermined critical value and outputting the input signal when the absolute value of the input signal is smaller than the predetermined critical value thereof.

20. The method of detecting binary data of claim 18, wherein the converting the input signal nonlinearly further comprises:

outputting the difference between the absolute value of input signal and the critical value when the absolute value of the input signal is bigger than the predetermined critical value, and outputting zero when the absolute value of the input signal is smaller than the predetermined critical value.

21. The method of detecting binary data of claim 18, wherein the converting the input signal nonlinearly is executed according to the following equation:

$$y = x \times \{|x| \leq k\} + k(-1)^{\{|x| \leq 0\}} \times \{|x| > k\}$$

wherein | | indicates an absolute value, the braces and their contents become one if a conditional expression contained therein is true and zero if a conditional expression contained therein is false, *x* is the input signal, and k is a predetermined value ranging from zero to a positive real number.

22. The method of detecting binary data of claim 18, wherein the converting the input signal nonlinearly is executed according to the following equation:

$$y = x \times \{|x| > k\} + k(-1)^{\{|x|>0\}} \times \{|x| > k\}$$

wherein | | indicates the absolute value, the braces and their contents become one if the conditional expression contained therein is true and zero if the conditional expression contained therein is false, *x* is the input signal, and k is the predetermined critical value ranging from zero to a positive real number.

23. A computer readable medium having embodied thereon a computer program of a method of detecting binary data from a signal read from an optical recording medium, the method comprising;

converting the input signal nonlinearly based on the result of comparing the absolute value of the input signal and a predetermined critical value; and

detecting binary data from the nonlinearly converted signal.

24. The computer readable medium of claim 23, wherein the converting the input signal nonlinearly further comprises:

saturating the input signal by the predetermined critical value when the absolute value of the input signal is bigger than the critical value and outputting the input signal when the absolute value of the input signal is smaller than the critical value.

25. The computer readable medium of claim 23, wherein nonlinearly converting the input signal further comprises:

outputting the difference between the absolute value of the input signal and the critical value when the absolute value of the input signal is bigger than the critical value and output zero when the absolute value of the input signal is smaller than the critical value.